FOREST PRODUCTS
Project Fact Sheet

DEVELOPMENT OF SCREENABLE PRESSURE SENSITIVE ADHESIVES

BENEFITS OF IMPROVED CONTAMINANT REMOVAL

- Improves energy efficiency of paper industry
- Reduces equipment downtime
- Reduces landfilling of paper
- Increases product quality
- Lowers fiber loss
- Lowers chemical costs

APPLICATIONS

Information from this study will be used in the design of new PSAs that can be more easily removed from the papermaking process benefiting the paper industry, adhesive manufacturers and consumers

New adhesives that are designed for easier removal from the papermaking process through screening

The presence of PSAs in recycled paper creates a number of problems for the recycling process including lost production and diminished product quality. This project will focus on the design of adhesive materials that are more effectively removed from the papermaking process during furnish screening. These new adhesives should possess properties that enhance their removal without impacting their performance in PSA products.

Work will include the identification of mechanical, surface and chemical properties that control adhesive comminution and use of this information to design new adhesives optimized for both removal and product performance. Initial synthesis approaches will include the use of both internal and external crosslinking to manipulate strength and wetting of PSAs. Crosslinked PSAs will break down into larger, harder and non-tacky particles that are more easily removed through conventional screening, and the crosslinking reactions may be controlled through external stimuli allowing the reactions to be initiated during recycling. In addition to the development of new adhesives, the role of the adhesive substrate will be investigated. Use of treatments such as wet-strength resins to modify label swelling and strength will be tested to determine how substrate mechanical properties and substrate-adhesive interactions affect the break down of label systems in an aqueous environment. Combinations of approaches will also be examined including the coating of new PSAs on treated labels and PSA-substrate crosslinking.

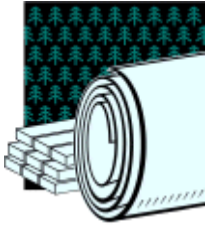
Characterizing particle morphology at various stages of the repulping process using tools such as optical microscopy, SEM and FBRM provides insight into comminution mechanisms.

PROJECT OBJECTIVE

The project objective is the design of new pressure sensitive adhesive (PSA) products that are engineered for enhanced removal during the screening of a recycled fiber furnish. Research includes the synthesis, characterization, and performance measurements of new screenable PSAs, testing of modified adhesive substrates, and design of test methods to gauge disintegration inhibition of adhesive labels and relative removal efficiencies of developed polymers.

PROJECT TASKS

- Develop tests to gauge stickie removal efficiency via screening
- Determination of properties that control the comminution of label systems
- Develop and characterize new PSA chemistries
- Determine how substrate properties influence break down of adhesives
- Optimize the PSA formulations and examine their end-use properties
- Perform repulping studies using PSA-coated, treated substrates
- Evaluate the repulpability of the novel PSAs and combination approaches
- Prepare and conduct pilot trials



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